Montana Fish, Wildlife & Parks

SPECIFICATIONS FOR WORK
SPECIAL PROVISIONS

Contents:

1. PROJECT DESCRIPTION

The Project involves construction work associated with:

Grant Marsh FAS 2020 Road Repair Project
Fish, Wildlife & Parks (FWP) Project # 7173729
Located in Bighorn County, MT

The project generally includes relocation of 2550 lineal feet of access road servicing the Grant Marsh Fishing Access Site near Hardin, Montana. This work includes clearing and grubbing, installing one new 24" diameter culvert, four 12" diameter culverts, placing 190 cubic yards of rip-rap, replacing and armoring a low water crossing (ford) with 4431 square feet of tied concrete block mat, constructing drainage swales, excavation/embankment construction and grading of a new roadbed along with placement of a gravel base course 6" deep for road surfacing.

2. PROJECT RELATED CONTACTS

Project contacts are designated as follows:

Owner:
Montana FWP
1420 E. Sixth Ave.
PO Box 200701
Helena, MT 59620-0701

FWP Project Representative:
Thomas M. Mannatt
FWP Project Manager
1522 9th Avenue
Helena, MT 59620
406-841-4006 (wk)
406-431-4031 (cell)
406-841-4004 (fax)

3. SITE INSPECTION

All Bidders should satisfy themselves as to the construction conditions by personal examination of the site described in this document. Bidders are encouraged to make any - investigations necessary to assess the nature of the construction and the difficulties to be encountered, see General Conditions, Article 3.

4. SOILS INFORMATION

Geotechnical investigation work has not been done for this Project and is not a job requirement.

5. PROJECT REPRESENTATIVE, INSPECTIONS, AND TESTING

The Contractor's work will be periodically tested and observed to insure compliance with the Contract Documents. Complete payment will not be made until the Contractor has demonstrated that the work is complete and has been performed as required. If the

Project Representative detects a discrepancy between the work and the requirements of the Contract Documents at any time, up to and including final inspection, such work will not be completely paid for until the Contractor has corrected the deficiency, see General Conditions, Article 9.

The Project Representative will periodically monitor the construction of work to determine if the work is being performed in accordance with the contract requirements. The Project Representative does not have the authority or means to control the Contractor's methods of construction. It is, therefore, the Contractor's responsibility to utilize all methods, equipment, personnel, and other means necessary to assure that the work is installed in compliance with the Drawings and Specifications, and laws and regulations applicable to the work. Any discrepancies noted shall be brought to the Contractor's attention, who shall immediately correct the discrepancy. Failure of the Project Representative to detect a discrepancy will not relieve the Contractor of his ultimate responsibility to perform the work as required, see General Conditions, Article 3.

The Contractor shall inspect the work as it is being performed. Any deviation from the Contract requirements shall be immediately corrected. Prior to any scheduled observation by the Project Representative, the Contractor shall again inspect the work and certify to the Project Representative that he has inspected the work and it meets the requirements of the Contract Documents. The Project Representative may require uncovering of work to verify the work was installed according to the contract documents, see General Conditions, Article 12.

The work will be subject to review by the Project Representative. The results of all such observations, and all contract administration, shall be directed to the Contractor only through the Project Representative.

5.1 Services Required by the Contractor. The Contractor shall provide the following services:

a. Any field surveys to establish locations, elevations, and alignments as stipulated on the Contract Documents. FWP reserves the right to set preliminary construction staking for the project. The Contractor is responsible to notify FWP for any construction staking discrepancies.

b. Preparation and certification of all required shop drawings and submittals as described in the General Conditions, Article 3.

c. All testing requiring the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing laboratory acceptable to the Project Representative. The laboratory shall be staffed with experienced technicians properly equipped, and fully qualified to perform the tests in accordance with the specified standards.

d. Preparation and submittal of a construction schedule, including submittals, see General Conditions, Article 3. The schedule shall be updated as required, as defined in the Contract Documents.

e. All Quality Control testing as required by the Contractor's internal policies.

f. All Quality Assurance testing and/or re-testing as stated in the Contract Documents, see General Conditions, Article 13.

5.2 Services Provided by the Owner. The Owner shall provide the following services at no cost to the Contractor except as required for retests as defined in the Contract Documents.

a. The Project Representative may check compaction of backfill and surfacing courses using laboratory testing submittal information supplied by the Contractor. These tests are to determine if compaction requirements are being fulfilled in accordance with the Contract Documents. It is ultimately the responsibility of the Contractor to ensure that this level of compaction is constant and met in all locations.

b. Any additional Quality Assurance testing deemed appropriate by the Owner, at the Owner's expense.

6. ENGINEERING INTERPRETATIONS

Timely Engineering decisions on construction activities or results have an important bearing on the Contractor's schedule. When engineering interpretation affects a plan design or specifications change, it should be realized that more than 24 hours may be required to gain the necessary Owner participation in the decision process including time for formal work directive or change order preparation as required.

7. REJECTED WORK

Any defective work or nonconforming materials or equipment that may be discovered at any time prior to the expiration of the warranty period, shall be removed and replaced with work or materials conforming to the provisions of the Contract Documents, see General Conditions, Article 12. Failure on the part of the Project Representative to condemn or reject bad or inferior work, or to note nonconforming materials or equipment on the Contractors submittals, shall not be construed to imply acceptance of such work. The Owner shall reserve and retain all its rights and remedies at law against the Contractor and its Surety for correction of any and all latent defects discovered after the guarantee period (MCA 27-2-208).

Only the Project Representative will have the authority to reject work which does not conform to the Contract Documents.

8. UTILITIES

The exact locations of existing utilities that may conflict with the work are not precisely known. It shall be the Contractor's responsibility to contact the owners of the respective utilities and arrange for field location services. **One Call Locators, 1-800-424-5555**

The Contract Documents may show utility locations based on limited field observation and information provided to the Project Representative by others. **The Project Representative cannot guarantee their accuracy.** The Contractor shall immediately notify the Project Representative of any discrepancies with utility locations as shown on the Contract Drawings and/or their bury depths that may in any way affect the intent of construction as scoped in these specifications.

There will be no separate payment for exploratory excavation required to locate underground utilities.

8.1 Notification. The Contractor shall contact, in writing, all public and private utility companies that may have utilities encountered during excavation. The notification includes the following information:

a. The nature of the work that the Contractor will be performing.
b. The time, date and location that the Contractor will be performing work that may conflict with the utility.
c. The nature of work that the utility will be required to perform such as moving a power pole, supporting a pole or underground cable, etc.
d. Requests for field location and identification of utilities.

A copy of the letter of notification shall be provided to the Project Representative. During the course of construction, the Contractor shall keep the utility companies notified of any change in schedule, or nature of work that differs from the original notification.

8.2 Identification. All utilities that may conflict with the work shall be the Contractor's responsibility to locate before any excavation is performed. Field markings provided by the utility companies shall be preserved by the Contractor until actual excavation commences. All utility locations on the Drawings should be considered approximate and should be verified in the field by the Contractor. The Contractor shall also be responsible for locating all utilities that are not located on the Drawings.

Utilities are depicted on the Contract Documents in accordance with their achieved “Quality Levels,” as defined in the American Society of Civil Engineer’s Document, ASCE 38, “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data.” Reliance upon these data for risk management purposes during bidding does not relieve the Contractor, or Utility Owner from following all applicable utility damage prevention statutes, policies, and/or procedures during construction. It is important that the Contractor investigates and understands the scope of work between the project Owner and Engineer regarding scope of limits of the utility investigations leading to these utility depictions. Definitions of Quality Levels are described as follows:

a. "QUALITY LEVEL A" – (QLA): LOCATING THROUGH EXCAVATION. QLA data are highly accurate and are obtained by surveying an exposed utility. As such, both horizontal and vertical data are recorded. Survey accuracies are typically set at 15mm (1/2-inch) vertically, and to project survey standards horizontally (typically the same as for topography features), although these survey accuracies and precisions are generally left to the owner to specify in a scope of work. In addition to the applicable standard of care and any other additional standards imposed by commercial indemnity clauses, the accuracy of these location data is also typically guaranteed. Other data typically characterized include material type, surface elevation, utility size/capacity, outside dimensions, and configurations, soil type, and utility condition.

b. "QUALITY LEVEL B" – (QLB): DESIGNATING. QLB information is obtained through the application of appropriate surface geophysical methods to identify the existence and approximate horizontal location of utilities (a utility's "designation") within the project limits, followed by survey, mapping, and professional review of that designation. Underground utilities are identified by interpretation of received signals generated either actively or passively, and through correlating these received signals with visible objects (QLC) and record data (QLD) to determine function. Designated utilities that can't be identified are labeled as "unknowns." Although approximate has no accuracy associated with it, generally the locations are within inches rather than feet. The more utility congested the area or the deeper the utilities, the less likely it is that the designations will achieve that accuracy. These designations are then surveyed to project accuracies and precisions, typically third-order accuracy similar to other topography features. Note that surveying existing one-call marks does not lead to QLB data, since the genesis of the marks was not under the direct responsible charge of the professional certifying the QLB depictions, and one-call generally does not address unknown utilities, privately owned utilities, utilities without records, abandoned utilities, and so on. Nor does the professional have knowledge of the field technician's qualifications, training, and level of effort.

c. "QUALITY LEVEL C" – (QLC): SURFACE VISIBLE FEATURE SURVEY. QLC builds upon the QLD information by adding an independent detailed topography site survey for surface-visible appurtenances of subsurface utilities including but not limited to fire hydrants, valves, risers, and manholes. Professional judgment is used to correlate the QLD data to the surveyed features, thus increasing the reliability of both utility location and existence. It is a function of the professional to determine when records and features do not agree and resolve discrepancies. This may be accomplished by depiction of a utility line at quality level D, effectively bypassing or disregarding (but still depicting) a surveyed structure of unknown

origin. Additional resolution may result from consultation with utility owners.

d. “QUALITY LEVEL D" – (QLD): EXISTING RECORDS RESEARCH. QLD is the most basic level of information. Information is obtained from the review and documentation of existing utility records, verbal accounts, and/or one-call markings (to determine the existence of major active utilities and their approximate locations).

8.3 Removal or Relocation of Utilities. All electric power, street lighting, gas, telephone, and television utilities that require relocation will be the responsibility of the utility owner. A request for extending the specified contract time will be considered if utility owners cause delays.

8.4 Public Utilities. Water, sewer, storm drainage, and other utilities owned and operated by the public entities shall, unless otherwise specifically requested by the utility owner, be removed, relocated, supported or adjusted as required by the Contractor at the Contractor's expense. All such work shall be in accordance with these Contract Documents, or the Owner's Standard Specifications or written instructions when the work involved is not covered by these Specifications.

8.5 Other Utilities. Utilities owned and operated by private individuals, railroads, school districts, associations, or other entities not covered in these Special Provisions shall, unless otherwise specifically requested by the utility owner, be removed, relocated, supported or adjusted as required by the Contractor at the Contractor's expense. All work shall be in accordance with the utility owner's directions, or by methods recognized as being the standard of the industry when directions are not given by the owner of the utility.

8.6 Damage to Utilities and Private Property. The Contractor shall protect all utilities and private property and shall be solely responsible for any damage resulting from his construction activities. The Contractor shall hold the Owner and Project Representative harmless from all actions resulting from his failure to properly protect utilities and private property. All damage to utilities shall be repaired at the Contractor's expense to the full satisfaction of the owner of the damaged utility or property. The Contractor shall provide the Owner with a letter from the owner of the damaged utility or property stating that it has been repaired to the utility owner's full satisfaction.

8.7 Structures. The Contractor shall exercise every precaution to prevent damage to existing buildings or structures in the vicinity of his work. In the event of such damages, he shall repair them to the satisfaction of the owner of the damaged structure at no cost to the Owner.

8.8 Overhead Utilities. The Contractor shall use extreme caution to avoid a conflict, contact, or damage to overhead utilities, such as power lines, streetlights, telephone lines, television lines, poles, or other appurtenances during the course of construction of this project.

8.9 Buried Gas Lines. The Contractor shall provide some means of overhead support for buried gas lines exposed during trenching to prevent rupture in case of trench caving.

8.10 Pavement Removal. Where trench excavation or structure excavation requires the removal of curb and gutter, concrete sidewalks, or asphalt or concrete pavement, the pavement or concrete shall be cut in a straight line parallel to the edge of the excavation by use of a spade-bitted air hammer, concrete saw, colter wheel, or similar approved equipment to obtain a straight, square clean break. Pavement cuts shall be 2 feet wider than the actual trench opening.

8.11 Survey Markers and Monuments. The Contractor shall use every care and precaution to protect and not disturb any survey marker or monuments, such as those that might be located at lot or block corners, property pins, intersection of street monuments or addition line demarcation. Such protection includes markings with flagged high lath and close supervision. No monuments shall be disturbed without prior approval of the Project Representative. Any survey marker or monument disturbed by the Contractor during the construction of the project shall be replaced at no cost to the Owner by a licensed land surveyor.

8.12 Temporary Utilities. The Contractor shall provide all temporary electrical, lighting, telephone, heating, cooling, ventilating, water, sanitary, fire protection, and other utilities and services necessary for the performance of the work. All fees, charges, and other costs associated therewith shall be paid for by the Contractor.

9. CONSTRUCTION SAFETY

The Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees and subcontractors) and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve them from compliance with the obligations and penalties set forth therein, see General Conditions, Article 10.

10. CONSTRUCTION LIMITS AND AREAS OF DISTURBANCE

10.1 Construction Limits. Where construction easements or property lines, are not specifically called out on the Contract Documents, limit the construction disturbance to ten (10) feet, when measured from the edge of the slope stake grading, or to the adjacent property line, whichever is less. Disturbance and equipment access beyond this limit is not allowed without the written approval of both the Project Representative and the Owner of the affected property. If so approved, disturbance beyond construction limits shall meet all requirements imposed by the landowner; this includes existing roads used and/or improved as well as the construction of new access roads. Special construction, reclamation, or post-construction reclamation or other closure provisions required by the landowner on access roads beyond the construction limits shall be performed by the Contractor at no additional cost to the Owner.

10.2 Areas of Disturbances. Approved areas of disturbance are those areas disturbed by construction activities within the construction limits and along designated or approved access routes. Such areas may require reclamation and revegetation operations, including grading to the original contours, top soiling with salvaged or imported topsoil, seeding, fertilizing, and mulching as specified herein. Other areas that are disturbed by the Contractor's activities outside of the limits noted above will be considered as site damage or unapproved areas of disturbance, see General Conditions, Articles 3 and 10. This includes areas selected by the Contractor outside the defined construction limits for mobilization, offices, equipment, or material storage.

11. DECONTAMINATE CONSTRUCTION EQUIPMENT

Power wash all construction equipment entering the project site to prevent the spread of noxious weeds and aquatic invasive species. This applies to all FWP projects, whether or not individual construction permits specifically address cleaning of equipment.

12. TREE PROTECTION AND PRESERVATION

The Contractor and the Owner shall individually inspect all trees within the project construction limits prior to construction. The Owner shall determine which trees are to be removed and which trees are to be preserved. Construction of the grading, utilities and various roadway facilities must not significantly damage the trees root system or hinder it’s chances for survival. Reasonable variations from the Contract Documents, as directed by the Project Representative, may be employed to ensure the survival of trees.

13. CONSTRUCTION SURVEYS

The Contractor will be responsible for all layout and construction staking for the project. Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between Drawings, Specifications, and existing conditions shall be referred to the Project Representative for adjustment before work is performed.

Contractor shall be aware of property pins and survey monuments. Damage to these pins will require replacement of such by a registered land surveyor at no cost to the owner.

Original field notes, computations and other records take by the Contractor for the purpose of quantity and progress surveys shall be furnished promptly to the Project Representative and shall be used to the extent necessary in determining the proper amount of payment due to the Contractor.

14. MATERIAL SOURCES AND CONSTRUCTION WATER

The Contractor shall be responsible for locating all necessary material sources, including aggregates, earthen borrow and water necessary to complete the work. The Contractor shall be responsible for meeting all transportation and environmental regulations as well as paying any royalties. The Contractor shall provide the Project Representative with written approvals of landowners from whom materials are to be obtained, prior to approval.

The Contractor may use materials from any source, providing the materials have been tested through representative samples and will meet the Specifications.

Water for compaction efforts shall be supplied by the Contractor.

15. MATERIALS SALVAGE AND DISPOSAL

Notify the Owner for any material salvaged from the project site not identified in the Contract Documents. The Owner reserves the right to maintain salvaged material at the project site, compensate the Contractor for relocation of salvaged material, or agreed compensation to Owner for material salvaged by the Contractor.

Haul and waste all waste material to a legal site and obey all state, county, and local disposal restrictions and regulations.

16. STORED MATERIALS

Contractor shall use an approved storage area for materials. Materials and/or equipment purchased by the Contractor may be compensated on a monthly basis. For compensation, provide the Project Representative invoices for said materials, shop drawings and/or submittals for approval, and applicable insurance coverage, see General Conditions, Article 9.

17. STAGING AND STOCKPILING AREA

Contractor shall use staging and stockpiling sites for to facilitate the project as approved by the Owner. Contract Documents may show approved staging and stockpiling locations. Notify Owner within 24 hours for approval of staging and stockpiling sites not shown on the Contract Drawings.

18. SECURITY

The Contractor shall provide all security measures necessary to assure the protection of equipment, materials in storage, completed work, and the project in general.

19. CLEANUP

Cleanup for each item of work shall be fully completed and accepted before the item is considered final. If the Contractor fails to perform cleanup within a timely manner the Owner reserves the right to withhold final payment.

Review these Contract Documents for additional Final Cleanup specifications for specific measures, associated with Contractor responsibilities and final payment.

20. ACCESS DURING CONSTRUCTION

Provide access to all public and private roadways and approaches within the project throughout the construction period.

21. CONSTRUCTION TRAFFIC CONTROL

The Contractor is responsible for providing safe construction and work zones within the project limits by implementing the rules, regulations, and practices of the Manual on Uniform Traffic Control Devices, current edition.

22. SANITARY FACILITIES

Provide on-site toilet facilities for employees of Contractor and Sub-Contractors and maintain in a sanitary condition.

23. CONTRACT CLOSEOUT

The Contractor's Superintendent shall maintain at the project site, a "Record Set of Drawings" showing field changes, as-built elevations, unusual conditions encountered during construction, and such other data as required to provide the Owner with an accurate "as constructed" set of record drawings. The Contractor shall furnish the "Record Set" to the Project Representative following the Final Inspection of the Project.

The Contractor's final payment will not be processed until the "Record Set" of drawings are received and approved by the Project Representative.

24. MEASUREMENT AND PAYMENT

Review these Contract Documents for additional Measurement and Payment specifications for definitions. Quantities are listed on the Bid Proposal for Payment Items. Additional material quantities, volumes, and measurements may be shown on the Contract Document drawings and/or specifications.

Unit Price quantities and measurements shown on the Bid Proposal are for bidding and contract purpose only. Quantities and measurements supplied, completed for the project, and verified by the Project Representative shall determine payment. Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover Contractor's overhead and profit for each bid item.

The Owner or Contractor may make a Claim for an adjustment in Contract Unit Price if the quantity of any item of Unit Price Work performed by the Contractor differs materially and/or significantly (increase or decrease by 50%) from the estimated quantity indicated on the Bid Proposal.

Lump sum bid item quantities will not be measured. Payment for these lump sum bid proposal items will be paid in full amount listed on the Bid Proposal when accepted by the Project Representative, unless specified otherwise.

Montana Fish, Wildlife & Parks

SPECIFICATIONS FOR WORK
TECHNICAL PROVISIONS

Incorporation of Montana Public Works Technical Specifications.

The Technical Specifications as found in Montana Public Works Standard Specifications (MPWSS), Sixth Edition, April 2010 and/or current Addendums or Revisions; are hereby incorporated by reference and made a part of this Contract:

Incorporation of Montana Fish, Wildlife & Parks Technical Specifications and Modifications to MPWSS Technical Specifications.

In addition to the MPWSS Technical Specifications are the following Montana Fish, Wildlife & Parks Technical Specifications (modifications to MPWSS Technical Specifications).

SECTION 01050 - Field Engineering
SECTION 01450 - Mobilization/Demobilization
SECTION 01750 - Final Cleanup
SECTION 01800 - Erosion and Sediment Control
SECTION 02230 - Street Excavation, Backfill, and Compaction
SECTION 02235 - Crushed Base Course
SECTION 02240 - Rip Rap
SECTION 02205 - Tied Concrete Block Mat
SECTION 02725 - Drainage Culverts
SECTION 02810 - Fencing
SECTION 02910 - Revegetation

SECTION 01050

FIELD ENGINEERING

All applicable portions of this specification section in the MPWSS shall apply with the following additions, deletions and/or modifications.

PART 3 EXECUTION

1.1 CONSTRUCTION SURVEY

A. Engineer will provide survey control (northing/easting), benchmarks(vertical datum), and grade stakes for all designed alignments and profiles, as shown on the project Plans. Engineer will provide one set of stakes prior to the construction of the various project elements. The contractor shall notify the Engineer 72 hours in advance that the site has been prepared and staking is needed to start construction.

B. Contractor shall perform all additional surveying, staking, recording of data, and calculations as necessary to construct the project from the initial layout to final completion. Reset stakes as many times as necessary to construct the work.

C. The Engineer will set center alignment stakes and key geometric points and described above in item A. The contractor set reference stakes, based the Engineer's stakes, at 50' intervals on tangent sections and at 25' on horizontal curves or as necessary to construct the work. Additionally, the Contractor shall set reference/slope stakes at PC and PT locations as well as the begin and end of project stationing. Limit grade stake tolerances to +/-0.1'.

PART 4 MEASUREMENT AND PAYMENT

Add the following:

A. Construction Surveying is incidental to the work and no separate payment is made for this item.

END OF SECTION 01050

SECTION 01450

MOBILIZATION/DEMOBILIZATION

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This item shall consist of the prepatory work and operations necessary performed by the Contractor for the movement of personnel, equipment, supplies, and incidentals to and from the work site. The work includes those actions necessary for obtaining necessary permits required for mobilization; for the establishment of all offices and facilities necessary to work on the project; for premiums on contract bonds; for insurance for the contract; and for other work on the various items on the project site. Mobilization costs for subcontracted work shall be considered to be included.

B. Contractor's cost for administration, bonding, insurance, and site documents shall be included in mobilization and shall not be paid as a separate item.

C. All equipment moved to the project sites shall be in good mechanical condition and free of fuel, oil, lubrication, or other fuel leaks. The Contractor shall immediately remove any equipment potentially or actually discharging environmentally damaging fluids.

D. All equipment moved to the project sites shall be thoroughly cleaned before it is brought to the sites to prevent the introduction of weed seeds. Equipment removed from the sites may not be returned to the sites again until it is thoroughly cleaned again.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. There will be no direct measurement of this item.

4.2 PAYMENT

B. Partial payments for mobilization/demobilization will be made based on the lump sum bid price as follows:

- 25% of the amount bid for mobilization/demobilization when the Contractor has moved on-site and begun construction activities.
- 50% of the amount bid for mobilization/demobilization when 25% of the contract amount (exclusive mobilization/demobilization) has been completed.
- 75% of the amount bid for mobilization/demobilization when 50% of the contract amount (exclusive mobilization/demobilization) has been completed.
- 100% of the amount bid for mobilization/demobilization when 75% of the contract amount (exclusive mobilization/demobilization) has been completed.

END OF SECTION 01450

SECTION 01750

FINAL CLEANUP

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of final cleanup of the project site prior to final acceptance.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CONTRACTOR RESPONSIBILITES

The contractor shall be responsible for final clean up at the end of the project to a level satisfactory to the owner. All construction debris, no mater how small, shall be collected and removed from the site. All wheel ruts shall be filled in and be leveled to match the adjacent grade and material. Re-seeding or re-sodding, or other re-surfacing may be necessary to repair any construction related impacts or damage.

All survey markings set as control points and boundary corners shall not be disturbed. If the contractor encounters a control point or boundary corner and it is in the way of construction it shall be brought to the attention of the FWP project representative so that it can be avoided or properly preserved. The Project surveyor shall identify control points, whenever possible, with a marking/point to be saved.

All final slopes shall be dressed manually to remove woody debris, accumulated trash and oversized material. Any new slope or topsoil surfaces shall be hand raked to provide a uniform appearance. The contractor shall dress all gravel, pavement and concrete edges to eliminate abrupt edges and provide a smooth transition. All construction related temporary sediment control devices shall be removed as soon as practical.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

Unless specifically noted otherwise, all final cleanup work shall be incidental to other work items in the contract and no separate payment shall be made.

END OF SECTION 01750

SECTION 01800

EROSION AND SEDIMENT CONTROL

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing, constructing, and maintaining permanent and temporary erosion control and sediment control measures as shown on the project drawings and/or project related construction permits.

PART 2 PRODUCTS

2.1 GENERAL

A. Temporary and erosion control products utilized include but are not limited to backfill material; berms; brush barriers; erosion control blankets, bales, wattles, logs, rolls; erosion control culvert pipe; detention basins; fertilizer; geotextile; mulch; plastic lining; riprap; sandbags; seed; silt fence; and water.

2.2 EROSION CONTROL WATTLES

A. Where designated, provide a sediment retention product made from straw and coconut fiber reinforced with a 100% bio-degradable netting. Use wood stakes to secure sediment retention product in place, spacing per the manufacturer's recommendations. An acceptable product is *Sediment Stop*, manufactured by *North American Green*, or approved equal.

2.2 EROSION CONTROL BLANKETS

A. Where designated, provide a sediment retention product made from straw and coconut fiber reinforced with a 100% bio-degradable netting. Use wood stakes to secure sediment retention product in place, spacing per the manufacturer's recommendations. An acceptable product is *BioNet® S150BN™*, manufactured by *North American Green*, or approved equal.

2.3 SILT FENCE

A. Where designated, provide silt fencing in accordance with Section 01802 Silt Fence of these specifications.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction according to the contract erosion control plan, environmental permits, and as directed by the Project Representative. These erosion control measures shall be designed, implemented, and maintained by the Contractor in accordance with Best Management Practices (BMPs) to control erosion and sediment release from the work site.

B. Install permanent and temporary erosion control measures according to the Storm Water Pollution Prevention Plan (SWPPP), if applicable, approved construction permits, and erosion control drawings.

C. When erosion control measures are not functioning as intended, immediately take corrective action.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. All items in this section are incidental to the work and no separate payment is made for these items.

END OF SECTION 01800

SECTION 02230

STREET EXCAVATION, BACKFILL AND COMPACTION

All applicable portions of this specification section in the MPWSS shall apply with the following additions, deletions and/or modifications.

PART 1 GENERAL

1.3 DENSITY CONTROL TESTING

A. FIELD DENSITY TESTING

Delete this section and add the following:

In-place field density tests for quality assurance are at Contractors expense meeting AASHTO T238 (ASTM D2922) and AASHTO T239 (ASTM D3017), Nuclear Densometer Methods. Quality assurance field density testing frequency is once per compacted lift, or as directed by Engineer.

Retesting of failing areas is at the expense of the Contractor.

B. LABORATORY MAXIMUM DENSITY and OPTIMUM MOISTURE

Delete this section and add the following:

Quality assurance tests will be made by the Contractors independent testing laboratory for each on-site natural soil or each source of off-site material, including borrow material, to determine the laboratory maximum density values and optimum compaction moisture content under AASHTO T99 or ASTM D698.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

Add the following:

Obtain necessary burning permits if cleared and grubbed material is burned on site. All stumps within construction limits shall be grubbed under this contract.

During the clearing and grubbing portion of the work the contractor shall stockpile sufficient desirable topsoil material for constructing the proposed landscape mounds as shown on the Plans.

3.4 EXCAVATION

Add the following:

Sheeting, Shoring, and Bracing: Except where trench banks are cut back on a stable slope, provide and maintain all sheeting, shoring, and bracing necessary to protect workers, and to protect adjoining grades and structures from caving, sliding, erosion or other damage in accordance with Occupational Safety and Health Standards (29 CFR Part 1926 – Construction Standards for Excavations), the Site Specific Health and Safety Plan, and other applicable codes and governing authorities.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND PAYMENT

Delete this section and add the following:

A. CLEARING AND GRUBBING

1. Clearing and grubbing will not be measured for payment and is considered incidental to other work items in this Contract.

B. EXCAVATION AND EMBANKMENT

Excavation and embankment will be measured and paid for by:

1) the lineal foot (LF) of **additional swale** called for sheets 3 & 4 of the Plans
2) and lump sum for roadway (including roadside swale) shown on the plans.

END OF SECTION 02230

SECTION 02235

CRUSHED BASE COURSE

All applicable portions of this specification section in the MPWSS shall apply with the following additions, deletions and/or modifications.

PART 2 PRODUCTS

2.3 GRADATION

Add the following to Section 2.3:

F. The Contractor shall use 1-1/2 minus Crushed Base Course Material as specified in Section 02235 - Crushed Base Course for all material called out on the Plans as "Crushed Base Course". Testing of this material shall be provided if called for by the Engineer to show that this material meets this specification.

PART 3 EXECUTION

3.3 FIELD DENSITY REQUIREMENTS

Add the following:

D. The Contractor is responsible for providing all compaction testing by an independent testing agency.

E. Compaction testing locations and frequency will be performed as follows:

Compaction Testing	Location*	Frequency
Subgrade and Subbase	New Access Road	12
Crushed Base Course	New Access Road	12

* Station/Offset determined by Engineer

**Proof roll subgrade only for observation by Engineer prior to base course placement.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND PAYMENT

Crushed base course will be measured and paid for on a per cubic yard basis.

END OF SECTION 02235

SECTION 02240

RIP-RAP

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work shall consist of the construction of loose rock rip-rap revetments and blankets, including filter layers or bedding where specified.

PART 2 PRODUCTS

2.1 ROCK

A. General

Rock for rock riprap shall be obtained from designated sources or, shall conform to the following specifications:

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to sub-rounded in shape. The least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment.

Unless otherwise specified and except as provided below, the rock shall have the following properties:

a. Bulk specific gravity (saturated surface-dry basis) not less than 2.4.

b. Absorption not more than 4 percent maximum.

c. Soundness: Weight loss in 5 cycles not more than 10 percent when sodium sulfate and 15 percent when magnesium sulfate is used.

The bulk specific gravity and absorption shall be determined by ASTM Method C 127. The soundness shall be performed by ASTM Method C 88 for coarse aggregate modified as follows:

The test sample shall not be separated into fractions. It shall consist of 5000 + 300 grams of rock fragments, reasonably uniform in size and shape and weighing approximately 100 grams each, obtained by breaking the rock and selecting fragments of the required size.

After the sample has been dried, following completion of the final test cycle and washing to remove the sodium sulfate or magnesium sulfate, the loss of weight shall be determined by subtracting from the original weight of the sample the final weight of all fragments which have not been broken into three or more pieces.

The report shall show the percentage loss of weight and the results of the qualitative examination.

Rock that fails to meet the requirements stated in a, b, and c above, may be accepted only if similar rock from the same source has been demonstrated to be sound after five years of service under conditions of weather, wetting and drying, icing, and erosive forces similar to those anticipated for the rock to be installed under this specification.

B. Grading

The rock shall conform to the specified grading limits after it has been placed in the riprap.

The rock shall be free from dirt, clay, sand rock fines and other materials not meeting the required gradation limits.

At least 30 days prior to the delivery of rock from other than designated sources, the Contractor shall designate in writing the source from which they intend to obtain the rock The Contractor will also provide satisfactory documentation to the technician that the material meets the requirements of the specification. The Contractor shall provide the technician free access to the source for obtaining samples for testing. The size and grading of the rock shall be as specified in the special provisions.

Rock from the designated sources shall be excavated, selected and processed as necessary to meet the quality and grading requirements in the special provisions. The rock shall conform to the specified grading when installed as Class I or Class III riprap.

Class I Rip-Rap Gradation

Size	% Passing
9 inch	100
6 inch	30-60
3 inch	10-35
1.5 inch	0-25

Class III Random Rip-Rap Gradation

Weight of Stone	Equivalent Sphere Diameter[1]	% of Total WT That Must Be Smaller Then Given Size
2000 pounds	2.82 feet	100
1400 pounds	2.53 feet	70-90
700 pounds	2.00 feet	40-60
40 pounds	0.77 feet	0-10

Notes:
1. Based on unit weight of 165 pounds per cubic foot (2,675 kg/cubic meter)
2. WT means weight

2.2 FILTER AND BEDDING MATERIALS

When required, granular filter and bedding materials shall, unless otherwise specified, conform to Montana Construction Specification MT-117, Drainfill and Filters.

PART 3 EXECUTION

3.1 GENERAL

A. Furnish hard, durable, and angular in shape rock that is resistant to weathering and water action and free from overburden, spoil, and organic or other unsuitable material. During the excavation process, Do not use rounded stone or boulders from a streambed source as riprap. Angular faces of stone shall inter-lock to provide a stable surface.

3.2 SUBSURFACE PREPARATION

The subgrade surfaces on which the riprap or bedding course is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.
Riprap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Technician.

3.3 EQUIPMENT – PLACED ROCK RIPRAP

The rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will ensure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks.
Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to the permanent works.

3.4 HAND – PLACED RIPRAP

The rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge.

3.4 FILTER LAYERS OR BEDDING

When filter layers or bedding beneath riprap is specified, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.
When a geotextile filter is specified, the material used shall be non-woven and meet the requirements as outlined in Table 1. Geotextile shall be joined by over-lapping a minimum distance of 18 inches. Anchoring of the fabric is not required but care shall be taken to minimize displacement.
Rock riprap shall not be dropped from a height greater than three feet on geotextile. Sufficient hand work shall be done to produce a dense section with a neat and uniform surface.

TABLE 1. REQUIREMENTS FOR NONWOVEN GEOTEXTILES

PROPERTY	TEST METHOD	Class I	Class II
Weight - Typical	ASTM D-5261	8.0 oz/sy	10 oz/sy
Tensile Strength	ASTM D-4632	205 lbs	230 lbs
Elongation @ Break	ASTM D-4632	50%	50%
Mullen Burst*	ASTM D-3786*	350 psi	500 psi
Puncture Strength*	ASTM D-4833*	110 lbs	120 lbs
CBR Puncture	ASTM D-6241	500 lbs	700 lbs
Trapezoidal Tear	ASTM D-4533	80 lbs	95 lbs
Apparent Opening Size	ASTM D-4751	80 US Sieve	100 US Sieve
Permittivity	ASTM D-4491	1.35 Sec-1	1.2 Sec-1
Water Flow Rate	ASTM D-4491	90 g/min/sf	80 g/min/sf
UV Resistance @ 500 Hours	ASTM D-4355	70%	70%

*Historical averages (current values not available): Mullen Burst Strength ASTM D-3786 is no longer recognized by ASTM D-35 on Geo-synthetics as an acceptable test method. Puncture Strength ASTM D-4833 is not recognized by AASHTO M288 and has been replaced with CBR Puncture ASTM D-6241.

Use Class I for d50 $\leq$ 15”
Use Class II for d50 $\geq$ 16”

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

Measurement and payment will be made to the nearest cubic yard and will be based on the neat Lines shown on the drawings.

Such payment will constitute full compensation for all materials, labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Compensation for geotextile or any other item of work shown on the drawings or described in

the special provisions but not listed on the bid schedule will be considered incidental to and included in the pay items listed on the bid schedule.

PART 5 SUBMITTALS REQUIRED

- Geotextiles

- The Contractor shall designate in writing the source from which they intend to obtain the rock.

- When other than pre-approved rock sources are selected for use, site specific test results shall be submitted demonstrating compliance with Section 2 of this specification.

Submittals are to be received by the Contracting Officer a minimum of 15 days prior to the start of placing rock material.

END OF SECTION 02240

SECTION 02242

TIED CONCRETE BLOCK MAT

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work shall consist of furnishing and placing the tied concrete block erosion control mats and blankets, including filter layers or bedding in accordance with this specification and conforming with the lines, grades, design, and dimensions as shown on the plans.

B. Installing shall conform to the system shown on the Plans and manufactures recommendations.

PART 2 PRODUCTS

2.1 Blocks

A. General

Furnish blocks manufactured with concrete conforming to the cement requirements of ASTM C150 and to the aggregate requirements of ASTM C33. Meet a minimum compressive strength of 5,000 psi at 28 days. Furnish blocks that have a minimum weight of 3 lb. per block. Blocks shall be placed no further than 2 in. apart.

2.2 Geogrid

Polypropylene Bi-Axial Geogrid. Provide revetment mat that is constructed of a high tenacity, low elongating, and continuous filament polypropylene fibers that is securely cast into and embedded within the base of the concrete blocks and obtains connection strength greater than that of the geogrid. Ensure the geogrid meets the requirements of Table 1:

Table1
Polypropylene Bi-Axial Geogrid

Description	Requirement
UV Stabilization	2% Carbon Black
Ultimate Tensile Strength	2055 lb./lf

2.3 Underlayment Materials Geogrid

Underlayment Materials - Underlayment Materials shall be provided and shall conform to the manufacture's recommendations.

2.4 Manufacturer

An acceptable tied concrete block mat product is manufactured by the following supplier:
Flexamat, manufactured by Motz Enterprises, Inc. or approved equal

Manufactuer's Address:	Local Distributor:
Motz Enterprises, Inc.	True North Steel
3153 Madison Road,	1501 S 30th St West
Cincinnati, Ohio 45209	Billings, Montana 59102
513-772-6689	406-656-2253
Sean Stallo sean@flexamat.com	Sarah Mogen <sarah.mogen@truenorthsteel.com>

Furnish all appurtenances called on the Plans and as specified by the manufacturer. The manufacturer's representative (rep) must be onsite for the beginning of the installation. Follow the manufacture's recommendations for all installation procedures.

2.5 Approved Equal Products

Alternative products may be considered if composition matches the materials detailed in Section 2. Such products must be pre-approved in writing by the Engineer prior to bid date. Alternative product packages must be submitted to the Engineer a minimum of fifteen (15) days prior to bid date. Submittal packages for alternate products must include, unless agreed otherwise by the Engineer, as a minimum, the following:

a. Product Properties – Composition of materials, stating product is comprised of the following components:

   i. **Concrete Blocks** - minimum compressive strength of 5,000 psi at 7 days. Furnish blocks that have a minimum weight of 3 lb. per block. Blocks shall be placed no further than 2 in. apart.

   ii. **Polypropylene Bi-Axial Geogrid** – minimum tensile strength of 2055lbs

   iii. **Underlayment** - Minimum of a double-net excelsior (wood fiber) blanket, plus additional turf reinforcement or filter fabric as specified by design engineer. Underlayment must be packaged within the Tied Concrete Block Mat rolls.

b. Full-Scale laboratory testing performed by an independent 3rd party testing facility with associated engineered calculations certifying the hydraulic capacity of the proposed Tied-Concrete Block Erosion Control Mat meets the performance requirements listed in Section 4 of this specification.

c. A list of 5 comparable projects in terms of project size, application and material dimensions in the United States, where the results of the specific alternative material's use can be verified and reviewed for system integrity and sustained after a minimum of 5 years of service life.

2.2 FILTER AND BEDDING MATERIALS

Granular base, filter and bedding materials shall, unless otherwise specified, conform to Section 02235 – Crushed Base Course of this specification.

PART 3 EXECUTION

3.1 GENERAL

A. Furnish all materials as specified by the manufacturer and as called for on the plans. Materials shall be stored onsite, if required, in a manner that they are kept clean and not damaged.

3.2 SUBSURFACE PREPARATION

The subgrade surfaces on which the Tied Concrete Block Mat or bedding course is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill. Cut-off trenches shall be excavated to the minimum depth as shown on the Plans and shall be backfilled with Class I Rip Rap previously specified.

Riprap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Technician.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

Measurement and payment will be made to the nearest square foot and will be based on the neat Lines shown on the drawings.

Such payment will constitute full compensation for all materials, labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Compensation for geotextile or any other item of work shown on the drawings or described in the special provisions but not listed on the bid schedule will be considered incidental to and

included in the pay items listed on the bid schedule.

PART 5 SUBMITTALS REQUIRED

- Tied Concrete Block Mat or Flexamat
- Geotextiles

Submittals are to be received by the Contracting Officer a minimum of 15 days prior to the start of placing the Tied Concrete Block Mat or Flexamat and appurtenance materials.

End of Section 02250

SECTION 02725

DRAINAGE CULVERTS

All applicable portions of this specification section in the MPWSS shall apply with the following additions, deletions and/or modifications.

PART 2 PRODUCTS

2.2 PIPE MATERIALS

D. Other Pipe Material

Add the following:

Furnish prefabricated, high-density polyethylene (HDPE) pipe and manifold bends that provide water tight joints per the diameters designated on the project drawings or as directed by the Project Representative. HDPE pipe shall have a smooth interior and annular exterior corrugations and shall meet the following requirements:

- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306

An acceptable HDPE pipe product is manufactured by the following supplier:

N-12 WT IB (or approved equal)
Advantage Drainage System
4640 Trueman Blvd.
Hilliard, OH 43026
1-800-821-6710
www.ads-pipe.com

Furnish all fittings of the same material. Follow the manufacture's recommendations for installation procedures.

All specifications included in Section 2.2.C.1 of the MPWSS shall be in addition to the above specification for HDPE pipe.

PART 4 MEASUREMENT AND PAYMENT

Add the following:

4.6 DRAINAGE PIPE

A. 12" & 24" diameter HDPE Drainage Pipe Installation will be measured and paid on a per lineal foot basis, including all labor, equipment, materials and incidentals required for the completion of the work. The total length of pipe installed at each location shall be as shown on the plans.

END OF SECTION 02725

SECTION 02810
FENCING

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing, erection, and placement of new fencing per the drawings and specifications.

PART 2 PRODUCTS

2.1 GENERAL

A. Barbed wire shall be zinc-coated, steel barbed wire meeting the requirements of ASTM A-121. Breaking strength of strand wire shall be not less than 950 pounds. Barbs shall be uniformly spaced from 4 to 5 inches apart. Minimum weight of zinc coating shall be Class I. Wire shall consist of two twisted strands of 12 1/2 gage strands. "Red Brand" and " OK Brand Premium" are examples of wire that meet ASTM A-121. **Wire breaking strength and coating certification shall be provided to the Project Manager.**

B. Barbless wire shall be two smooth twisted strands of 12 ½ gage wire: zinc coated steel meeting requirements of ASTM A-121 or equal. Breaking strength of a strand of wire shall be not less than 950 pounds, minimum weight of zinc coating shall be Class I.

C. Woven wire shall have metallic coating Type Z, Class 1 and be No. 12 ½ Grade 60, or, have metallic coating Type Z, Class 3 and be No 14 Grade 125. All woven wire shall meet or exceed the requirements of ASTM A116.

D. Brace panel wire shall be barbless, smooth 9 gage **soft** wire meeting requirements of ASTM A-641. It will be used for constructing braces and panels, tying to anchors, etc.

E. Staples. Wire staples of the barbed U-shaped type shall be used to fasten the wire fencing to the wooden posts. They shall be not less than 9 gage galvanized, 1-3/4 inches long.

F. Nails. Shall be 40 d common galvanized.

G. Fence clips shall be not lighter than 12 1/2 gage, galvanized. They shall be used to fasten the wire to metal posts.

H. Where designated, stays shall be 30" long twisted wire fence specifically manufactured for use as fence stays and made from #9 gage galvanized smooth wire.

I . Metal Posts. Metal posts shall meet the requirements of ASTM A-702 and be American manufactured. Painting shall be in accordance with good manufacturing practice. Same paint pattern shall be used throughout project site requiring installation of new metal posts. Posts shall be 5 1/2 feet long. The metal shall be good commercial quality steel with maximum carbon content of 0.82%. Posts shall be Tee, H, channel, or U-bar section and shall have corrugations, knobs, notches, holes, or studs so placed and constructed as to engage a substantial number of fence line wires in proper position.

Each line post shall have a steel anchor plate weighing not less than 0.67 pounds, tapered to facilitate driving and securely fastened in such a position that its top edge will be two to three inches below ground when the post is driven to the prescribed depth. Post shall weigh 1.33 lbs. per L.F. of post.

J. Wood Posts and Brace Rail. Posts and brace rail shall be made from western larch, lodgepole pine, ponderosa pine, or douglas-fir. They shall have the bark removed, be well seasoned, sound, and straight-grained. They shall be finished round. **Panel posts** shall be **5**-inch minimum diameter and **7**-feet in length. **Line posts** shall be **4**-inch minimum diameter and **7** feet in length, or as specified in the project drawings. All posts shall be treated with a solution conforming to AWPA standards. Penetration shall be at least 1/2 inch. Post shall be fully treated. Posts that are to be driven shall be tapered and treated. **Brace rail** shall be a minimum **4**-inch diameter by **8** feet long, or as specified in the project drawings. All brace rail shall be fully treated conforming to AWPA standards. **Certification of AWPA treatment shall be provided to the Project Manager.**

K. Wood Rails. Wooden rails shall be made from western larch, lodgepole pine, ponderosa pine, or Douglas-fir. They shall have the bark removed, be well seasoned, sound, and straight-grained. They shall be finished half round. **Wood rails** shall be **4 1/2** inch minimum diameter and **8** feet in length. All rails shall be treated with a solution conforming to AWPA standards. Penetration shall be at least 1/2 inch. All wood rail shall be fully treated conforming to AWPA standards. **Certification of AWPA treatment shall be provided to the Project Manager.** Fasten rails to posts with 5" *Ledgerlock* screws, or approved equal.

L. Brace Panels. Shall be placed at corners, endpoints and when run exceeds **30 rods** – then shall be placed to split the difference when appropriate. Brace panels shall be constructed as depicted in drawings and shall provide for strong anchorage points and shall aligned with fenceline within a tolerance of 2 degrees.

M. Gates and Single Panels. Vehicle and pedestrian gates shall by 16'-18' wide and 4' wide, respectfully, and shall be located in the field by the Engineer. Post and brace rail shall be the same as specified for line fence panels and corners.

Where designated, wire gates shall have 4 strands of barbwire with 2 wood stays. Stays shall be 3/4" x 1 1/2" wood. Each gate shall have a new single panel on each side of wire gate and a mechanical over-center gate closer.

Where designated, install prefabricated panel gates (various lengths) as shown on the project drawings. Panel gates shall be brown or green in color. Provide galvanized chain long enough to wrap around gate and adjacent brace panel for locking closure.

N. Stream Crossings. Stream crossings shall be minimum 20' wide and located 4' minimum on each side of the top of streambank. Post and brace rail shall be the same as specified for line fence panels and corners. Stream crossings shall have 5 strands of smooth wire with a minim of 6 metal stays. Stays shall be 30" long twisted wire fence specifically manufactured for use as fence stays and made from #9 gage galvanized smooth wire.

Extend stays to bottom wire attached to posts, creating a hinge point to pass debris. Thread bottom wires of stream crossing though 1.5" diameter PVC pipe between stays. Bottom wire to be 1 ft above water elevation.

Each stream crossing shall have a new single panel and mechanical over-center closure on each side.

O. Deadmen anchors shall be used at grade depressions. They shall consist of 10 gage mild steel of 12-inch diameter. A No. 5 rebar shall be welded in the center and a loop formed in the other end to accept the tie wire. Rebar length shall be 30 inches after the loop is formed. Other anchor types may be accepted upon approval of the Engineer. Duckbill anchors are also approved.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

A. "Clearing" shall consist of the falling of trees greater than 3 inches diameter breast height (dhb), delimbing them, and cutting into six-foot sections. Clearing shall also include the disposal of stumps, brush, windfalls, limbs, sticks, piles of sawdust, rubbish, debris, vegetation, and other objectionable material occurring within the clearing limits or which interfere with excavation or embankment.

B. "Grubbing" shall consist of the removal from the ground and the disposal of roots, stumps, together with duff, matter, roots, and debris from the grubbing limits.

C. Construction methods for clearing and grubbing operations are as follows:

(1) No stumps or roots shall remain more than 4 inches above the ground along the fence line.

(2) Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed as directed. Branches of trees extending over the fence line shall be trimmed to give a clear height of 8 feet above the ground along the fence line. Width of clearing for fence line shall be 4 feet.

3.2 FENCE INSTALLATION

A. Post holes and excavations for footings and anchors shall be excavated on the lines established by the Engineer to the depths and cross-sections shown on the standard drawings. Wooden posts may be driven when so prepared and any damaged posts shall be repaired or rejected. Post shall be plumb when set.

B. All posthole filling and backfilling work shall be in six-inch layers and each layer shall be solidly tamped and compacted as it is placed.

C. Posts that are cut or trimmed for any valid reason shall be given two coats of preservative material approved by the Engineer. Braces shall be securely nailed to terminal and brace posts. Brace to post joint shall be coped or notched. No square to round joint accepted.

D. Deadmen or anchors will be used at grade depressions or other places where the vertical space from the ground to the bottom fence wire has exceeded the design value within a one rod distance.

E. Brace panels shall be installed at angle points, corners, gates, or wherever a break in the terrain occurs. However, in no case shall brace panels be more than **30 rods apart**. See Table 1 for brace panel installation requirements. One strand of brace wire will be used in accordance to standard drawing. Brace wire shall be tight when twisted. Barbwire fence wire shall be tied off at each brace.

Table 1. Brace Panel Installation Requirements

Panel Type	**No. of Panels**	**Location Applications**	
		Horizontal	**Vertical**
Single	1	In Line, Each side of gates	Constant Grade
Double	2	Angle points < 90°	Grade Breaks < 45°
Corner	4	90° Corners	Grade Breaks > 45°

F. All posts shall be plumb and solidly set in place after backfilling or driving has been completed.

G. Stretching by a motor vehicle will not be permitted; the power must be by or through a mechanical stretcher or device designed for such use.

H. Fence line shall be straight and square between corner points.

I. Fence clips shall be bent all the way around fence wire.

J. Tension shall be applied in accordance with wire manufacturer's recommendations.

K. Fence wire shall be wrapped around terminal posts and fastened to itself with at least four turns. Fence wire, in general, shall be placed on the side of the post opposite the site but on curves shall be placed so the force is against the post. At grade depressions and alignment angles, where stresses tending to pull posts from the ground are created, the wire fence shall be snubbed or guyed at the critical points by brace wire attached to each horizontal line of fence wire and the end of the combined strands being firmly attached to a "deadman" buried not less than two feet in the ground, or to an approved "anchor" at a point which will serve best to resist the pull of the wire fence. "Deadmen" also may be fastened to posts. Fence wire and brace wire shall be installed without nicks or significant abrasions. Nicks or abrasions that may lead to pre-mature wire breaks shall be rejected by the Project Manager and replaced at no cost by the Contractor.

L. U-shaped staples shall be driven diagonally across the wood grain so that both points do not enter between the same grain. In depressions where wire up-lift occurs, staples shall be sloped slightly upward, against the pull of the wire. On level ground and over knolls, staples shall be sloped slightly downward. Wire shall be stapled tightly at corner, end, and pull posts. In no case shall staples be driven so tight as to damage the wire.

M. A cross-fence, not the property of the Owner, shall not be fastened to the Owner's fence but shall be terminated, in a workmanlike manner, adjacent thereto.

N. Upon completion, the fence shall be true to line and grade; all posts shall be vertical and firm and all wire shall be taut and the completed fence shall be completely acceptable in all respects; no openings shall be left that will permit stock or other large animals to pass through the fence.

O. Weed Control: All equipment used during construction shall be thoroughly washed both inside, outside, underneath, pickup boxes, trailer's, trucks, etc. before entrance to the project area. Vehicles used to commute to and from job site shall be kept clean as not to transport weed seed to project area. This cost shall be subsidiary to the project and considered incidental thereto and no payment shall be made for it.

PART 4 MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT

A. All types of fence will be measured by the linear foot complete in place, on its actual alignment, inclusive of brace panels and corners. The measurement will be made on the fence line along the ground, from end post to end post, including wing fences to structures, the intent being to measure the actual length of fence in place. If it is necessary, in crossing depressions, to install a double section of fence, vertically, this extra section will be measured for payment.

B. Gates will be measured on a per each basis, including 2 single panels.

C. Deadmen anchors, stream crossings, tree anchor, and any line clearing required shall be subsidiary to the fence and considered incidental thereto.

4.2 BASIS OF PAYMENT

A. All types of fence shall be paid for per lineal foot basis, measured as specified above.

B. Gates will be paid for on a unit price per each basis.

END OF SECTION 02810

SECTION 02910

REVEGETATION

All applicable portions of this specification section in the MPWSS shall apply with the following additions, deletions and/or modifications.

PART 1 GENERAL

1.1 DESCRIPTION

Add following:

This work also includes conserving, placing, and finishing topsoil placement at designated areas on the project drawings or as directed by the Engineer.

PART 2 PRODUCTS

2.1 SEED

Add the following:

Utilize the following seed mix for all areas to be seeded.

Seed Name	% Pure Live Seed	Lbs. Per Acre
Western Wheatgrass	30	*
Bluebunch Wheatgrass	20	*
Hard Fescue	20	*
Slender Wheatgrass	15	*
Green Needlegrass	15	*

* Drilled Rate = 25 lbs/acre, Broadcast and Hydroseed Rate = 50 lbs/acre

2.2 TOPSOIL

Add the following:

Utilize all salvaged topsoil conserved from clearing and grubbing operations to cover excavation and embankment slopes prior to fertilizing, seeding, or mulching.

2.4 FERTILIZER

Delete this Section.

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

Delete this section and add the following:

A. Unless specified otherwise, all revegetation work shall be incidental to other work items in the contract and no separate payment shall be made.

B. Placing conserved topsoil will not be measured for payment and is considered incidental to other work items in this Contract.

END OF SECTION 02910